

Data Validation Report

TDD No: 09-04-01-0011
PAN: 001275.0440.01TA
Site: El Dorado Hills
Laboratory: Lab/Cor, Inc.
Reviewer: Denise A. Shepperd, Trillium, Inc.
Date: May 19, 2005
Revised August 11, 2005

I. Case Summary

SAMPLE INFORMATION:

Asbestos Samples: AAMS-D09-100504; AAMS-D10-100604; and AAMS-D16-101204
Matrix: 3 Air samples
Analysis: Asbestos by Transmission Electron Microscopy
Collection Dates: October 5 through 12, 2004
Sample Receipt Date: October 14, 2004
Filter Preparation Date: January 21, 2005 and March 22, 2005
Grid Preparation Date: March 22, 2005
TEM Analysis Dates: March 29 and 31, 2005
Analytical Method: ISO Method 13794

FIELD QC:

Field Trip Blanks (ZB): NFB-L2-1ZB-10050; SFBB-L2-1ZB-10060; NYB-L2-1ZB-10070;
JEG-L2-1ZB-10070; SRA-1ZB-1008004
Filter Blanks (FB): SFBA-L2-FB-10050; JEG-L2-FB-101004; NRA-FB-101004
Column Blank (FB): NRA-FB-101005
Equipment Blanks (EB):
Method Blank (MB): 4 glass filter blanks
Field Duplicates (D1): Not Identified

TABLES:

1A: Analytical Results with Qualifications
1B: Data Qualifier Definitions for Inorganic Data Review

SAMPLING ISSUES:

No chain of custody documents were provided in the data package. Chain of custody documentation that included these samples was provided on 5/4/05 by electronic transfer, at the request of the validator.

VALIDATION PARAMETERS AND COMMENTS:

I. Holding Times, Preservation and Sample Integrity

This parameter is evaluated to ensure that sample custody is documented from collection through analysis, samples are analyzed within the recommended holding time, and that no alteration in sample content has occurred during sample shipment, handling, and storage.

There is no established holding time or storage condition for asbestos samples.

II. Calibration

The analyses of materials of known content ensures that identification and quantitation of analytes will be accurate for all samples. Review of the documentation provided for appropriate calibration determines whether or not the analytical results reported by the laboratory are valid and supported by the data.

The data deliverables for this project were included in multiple data packages in several shipments. Instrument calibration documentation was provided in a separate data package in association with the site sample data packages in this shipment and included camera and screen magnification calibration (performed 4/7/05 to 4/13/05), camera length and constant calibration (performed 4/5/05 to 4/14/05), EDS peak resolution check (performed on 4/7/05), and maintenance logs for both instruments used for analyses, covering the months of March and April of 2005.

A form entitled "Microscope Based Quality Control" for the month of April 2005 was included. This form listed the various instrument calibration parameters, required frequencies, dates performed, and results. According to this form, k-factor calibration was performed most recently on the two microscopes on 1/11/05 and 3/14/05; beam dose was calibrated on 2/9/05 and 3/18/05.

No documentation of grid opening size was provided.

Documentation to support the identification and quantitation in the site samples in these data packages was provided separately with a previous shipment of data packages from the same project, and included the following:

A letter representing documentation of an NVLAP laboratory site assessment conducted on 11/7/03 was included in the data package. The letter, dated 5/10/04, indicated that the laboratory met the on-site assessment requirements.

Results and evaluator notes and tables were included for an NISTIR 5351 analysis of an inter-laboratory QC sample. The laboratory's raw data were compiled and assessed by Batta Labs. Analysts were identified by initials and included one of the two analysts' initials documented with this sample set. "DW" and "KM" performed these PE sample analyses, "JH" was not represented. According to the assessor's notes, the sample included chrysotile fibers and structures and the laboratory's results were within NVLAP and NISTIR 5351 acceptance limits. No raw data were provided for this QC sample in the original data package. Raw data were provided under separate cover, at the request of the validator.

Results for a New York State Department of Health Environmental Laboratory Approval Program proficiency test, conducted between 9/7/04 and 11/9/04, were also included. The proficiency samples included asbestos in air. The laboratory's results were satisfactory for all four of the air sample categories. Actinolite and amosite fiber types were identified and counts were acceptable, according to the data sheet. No raw data were provided for this proficiency sample. Upon request, the laboratory provided raw data documenting the identification of actinolite

and amosite asbestos on 1/27/05, in conjunction with the validation of a previous shipment of data packages. These data were inserted by the validator into the QC data package provided, as supporting data, with the previous shipment of data packages.

Documentation for a round-robin sample analyzed in the fall of 2004, by three separate laboratories, as part of the NVLAP requirements, was also included in the QC data package. The documentation included raw count sheets and reported results, as well as comparison with other laboratories' results. Results for all parameters were acceptable. According to the documentation, the only analyst who participated in these analyses was "DW."

Based on the fact that the laboratory demonstrated proficiency in the performance evaluation (PE) analyses performed in the third quarter of 2004, and that these PE samples included the two predominant asbestos types detected in this field sample set, no action was taken by the validator.

III. Blanks

Sample matrices known to be devoid of the analytes of interest (method blanks) are prepared and analyzed with each analytical batch. Evaluation of this parameter ensures that contamination introduced during preparation and analyses is not attributed to the field samples.

Other blanks may be generated in the field or laboratory to ensure that no contamination is introduced during sampling and/or storage.

No field-generated blanks were included with this data set.

The laboratory preparation list and log indicated that one laboratory preparation filter blank was prepared and analyzed by the indirect method in association with the entire 70-sample set (041172, 041188, 041191, 141210, and 050680). No raw data were supplied for this blank, but a value of "0" structures detected was present on the QC summary form. According to the prep sheets, this blank was prepared on 1/13/05 (ashed and "hydrolyzed") and 3/16/05 (grid preparation). This blank would be an indicator of any contamination present in the blank filters used for preparation and for any contamination present in the prep lab environment on 1/13/05 and 3/16/05, but it does not address contamination issues for the dates on which the samples in this data set (041210) were prepared.

The indirect method used (ISO 13794), recommends analyzing a filter blank and a beaker blank with each set of samples prepared. In addition, it is recommended that the laboratory include an unused filter for preparation with every microscope slide containing sample filters that is prepared. None of these blanks were documented with this data set. Without blanks it is not possible to assess the presence or absence of laboratory contamination or its impact on the site sample results.

The laboratory had prepared blanks with the preparation and analyses of samples in this data set. At the client's request the laboratory analyzed a percentage of the prepared blanks. Data for these blanks were received by the validator on July 6, 2005. Four filter blanks, five field trip blanks, four glass filter blanks, and one column blank were prepared and analyzed as laboratory blanks. No asbestos structures were detected in any of the blanks.

IV. Spiked Samples

The analytes of interest are added in known concentrations to like-matrix blanks or authentic field samples before preparation. This parameter is evaluated in order to assess the laboratory's ability to preserve and recover the compounds of interest.

The analytical method does not require laboratory spiked sample analyses. It is recommended by the validator that some type of laboratory prepared or purchased spiked analyses be performed with each analytical sample batch.

The project requirements specified that results from the most recent inter-laboratory study would be acceptable as a laboratory control sample (LCS) for these data. This requirement was met by the laboratory and results, reported with previous data submissions for this project, for the inter-laboratory study sample were acceptable for all air sample parameters (see Section I). The data user should note, however, that no reference material was prepared and analyzed by the indirect method (ISO 13794) employed for the preparation and analyses of the site samples. This method is used when filter loading is too high to allow the use of the direct method (ISO 10312) and depends on recovery of material from the air-sampling filter, resuspension in solution, effecting a dilution, and redistribution on a secondary filter which is then prepared as for the direct TEM analysis method. Because there are additional steps involved in the preparation, there are additional error factors introduced. It is recommended that a reference material be prepared and analyzed by the indirect method so that performance can be tracked by the laboratory for support of field sample analyses by this procedure.

V. Duplicate/Replicate Samples

Results for duplicate/replicate samples are evaluated to assess the laboratory's precision for the analytes of interest in the applicable sample matrix. For asbestos analyses, duplicate and replicate measurements take the form of a combination of variables which include the preparation of the grid, the choice of grid openings to be analyzed, and the analyst performing the counting and identification of structures. For the indirect method the variables should also include preparation of the filter itself.

The laboratory included all of the QC samples from all of the field sample sets in this shipment in a separate data package under a separate report number (050580).

One of the two analysts, JH, not represented in the PE sample analyses included with the data packages for this project did perform intra-laboratory replicate and duplicate analyses on associated field samples. Results for these QC analyses for this analyst were within the sample-specific acceptance limits stipulated by the method.

The quality assurance project plan (QAPP) requires five types of laboratory duplicate/replicate analyses, each to be performed at a rate of 5% (one for every twenty) of the field samples. Based on the total of samples prepared by the indirect method and included in all of the data packages in this shipment combined (70 samples), four or more of each of these QC sample pairs were required (a total of 20 QC sample pairs).

The laboratory compared the primary asbestos structure count for each of the QC samples prepared and analyzed. Results for all of the duplicate/replicate pair types were evaluated based on 95% confidence limits determined from the original sample count result. Results for all of the reported QC samples were within the laboratory's calculated limits.

One of the samples (AAMS-D09-100504) in this data set (041210) was prepared as a replicate pair, wherein the same analyst counted a different grid preparation of the same sample. Results for these paired samples showed acceptable agreement (34 and 26; QC range 23.55 to 47.51)

The laboratory analyzed a total of 11 QC sample pairs from three of the associated data sets. A summary of the laboratory QC samples analyzed is as follows:

Replicate analyses:

- Two samples were analyzed as replicates, wherein a different preparation was analyzed by the same analyst;

Duplicate analyses:

- Three samples were analyzed as duplicates, wherein the same grid openings were recounted by a different analyst;
- Three samples were analyzed as duplicates, wherein different grid openings were selected for counting by a different analyst;
- Three samples were analyzed as duplicates, wherein a different analyst counted a different preparation.

No samples were analyzed as replicates, wherein the same analyst re-counts the same sample a second time counting different grid openings.

According to the preparation list and log, two samples (from 041188 and 041191) were re-prepared on 3/29/05 and 3/30/05. The second preparation of these two samples involved ashing the filters for two hours, according to notes on the prep list. It was assumed by the validator that these were the only samples which were carried through all of the filtering and grid preparation steps. Other QC samples listed as repreps were assumed to be additional grid preparations from the same filter only.

Agreement between the results for the 11 sample QC pairs analyzed in conjunction with the combined project-related laboratory batches in four of the required categories were acceptable. In addition, four samples were re-analyzed by the same analyst counting the same grid openings. These results were also acceptable according to the laboratory-specified limits. This category was not included as a requirement in the project QAPP.

The data user is cautioned that although the laboratory QC counts met the specified criteria, the acceptance range includes as much as a three-fold difference in asbestos concentrations for these samples. This range of variability is applicable to all asbestos results in this data set.

According to the QAPP provided with the data packages, field duplicates were required at a rate of 10% of field samples. Field duplicate pairs were not identified or evaluated as part of this validation effort.

VI. Identification

Identification of asbestos structures and fibers is dependent on sample preparation techniques, analyst training, instrument operation, and data interpretation. Comparison with results from known standards is used to evaluate the accuracy of the structure identification for field samples.

Actinolite, chrysotile, and tremolite were identified in the field and QC samples. According to the report forms provided in the QC package included with a previous data package shipment for the project, the laboratory correctly identified actinolite, chrysotile, and amosite in PE sample analyses performed in the third quarter of 2004. Comparison of identification between the various analysts, grid opening, and preparations combinations that make up the daily QC for these analyses, included separately with this shipment of data packages, were within acceptance limits. Therefore, based on the documentation provided, fiber and structure identifications for chrysotile, and tremolite/actinolite were determined to be valid as reported.

VII. Quantitation and Reported Detection Limits

Raw data documentation is reviewed to ensure that all reported results and detection limits are correctly calculated, accurately reported, and supported by the raw data.

Results for asbestos categories, fiber density, and detection limits were correctly calculated and accurately reported by the laboratory, with one exception. Results were verified by the validator using the information included on the reporting forms and the chain of custody records.

The number of grid openings counted, as reported on the Form I and prep list for sample AAMS-D10-100604 was 50. According to the count sheet for this sample, 52 grid openings were actually counted for this sample. Results for all fiber categories, the analytical sensitivity, and the detection limit were corrected by the validator for this sample on the data summary form, Form I, and electronic data deliverable (EDD).

VIII. System Performance

This parameter is evaluated to ensure that the laboratory analytical systems were functioning properly at the time of analyses and that methodology appropriate to the analyses were followed.

The analytical systems appear to have been working satisfactorily and to have been calibrated properly at the time of these analyses, based on the documentation provided in this data package shipment. Grid opening calibration and spot size calibration were not documented

IX. Documentation

Data and documentation completeness is critical in providing support for the reported results. Problems encountered with the nature or quality of the data package documentation are addressed.

No raw data were provided in the data package for the proficiency samples analyzed in support of the laboratory's accreditation. Raw data to support the identification of actinolite and amosite were received upon request on 1/26/05 in conjunction with validation of a previous shipment of data from the same project.

Raw data for chrysotile fibers identified in only selected field samples from this data set were provided. A listing of fiber verifications was provided and included at least one structure from each of the samples in which chrysotile was identified.

Count sheets included in the data package are computer generated forms. No date of the actual count is presented on these forms. If there is a corresponding bench sheet from which these forms are prepared, these should be supplied as a part of the data package. It is recommended that analyst's initials and date of count be added to the documentation.

The legend for the count sheets, which defines the codes used for the structure counts lists PSCH as the code for protocol chrysotile structures. The code appearing on the count sheets for this category is PCAS.

COMMENTS:

- A. The number of grid openings counted as reported on the Form I and prep list for sample AAMS-D10-100604 was 50. According to the raw data count sheet for this included in the data package, 52 grid openings were actually counted for this sample. Results for all fiber categories, the analytical sensitivity, and the detection limit were corrected by the validator for this sample on the data summary form, analysis detail (Form I), and electronic data deliverable (EDD).

ADDITIONAL COMMENTS:

The laboratory reported results, analytical sensitivity, and detection limits to three significant figures. The data user should be aware that because all of these values are based on the counting of whole asbestos structures, the

appropriate number of significant figures will be limited by the structure count. A total count of eight fibers will warrant results with only one significant figure; a count of 12 will warrant two, etc. Because the analytical sensitivity and detection limit are calculated from an assumed single asbestos structure, only one significant figure is accurate for these values, rather than the three reported by the laboratory. A second significant figure, if used, is considered estimated. The validator-calculated results, analytical sensitivities, and detection limits varied from the laboratory values in many cases, however, these discrepancies appeared to be due to rounding. The validator did not adjust the laboratory results to reduce the number of significant figures.

It is recommended that complete instrument calibration documentation be provided with every data package to fully support the site sample results.

The data results tables included as Table 1A include only the primary and total asbestos structure counts. Counts for individual categories required by the project Scope of Work are presented in the associated electronic data deliverables (EDD) tables.

This report was prepared according to the specifications of the analytical method, ISO Method 13794 "Ambient air - Determination of asbestos fibres - Indirect-transfer transmission electron microscopy method," the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 10/99, and Trillium, Inc.'s SOP No. 0497-06A, for Validation of Analytical Data: Inorganic Analytes.

Table 1A
Analytical Results with Qualifications
Asbestos in Air Samples

C-sample-num	Type	# of structures counted	Concentra tions	Analytical Sensitivity (AS)	Units	Lower	Upper	Val Adj Result Conc.	Val Qual	Val Adj AS	Val Units	Val Comm
AAMS-D09-100504	Primary Asbestos Structures	34	0.0103	0.000302	structures/ cc	0.0071	0.0143				structures/ cc	
AAMS-D09-100504	Total Asbestos Structures	34	0.0103	0.000302	structures/ cc	0.0071	0.0143				structures/ cc	
AAMS-D10-100604	Primary Asbestos Structures	101	0.0304	0.000301	structures/ cc	0.0236	0.0353	0.0292		0.00029	structures/ cc	A
AAMS-D10-100604	Total Asbestos Structures	101	0.0304	0.000301	structures/ cc	0.0236	0.0353	0.0292		0.00029	structures/ cc	A
AAMS-D16-101204	Primary Asbestos Structures	53	0.016	0.000301	structures/ cc	0.0119	0.0209				structures/ cc	
AAMS-D16-101204	Total Asbestos Structures	53	0.016	0.000301	structures/ cc	0.0119	0.0209				structures/ cc	

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document, "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," 2/94.

- U** The analyte was analyzed for, but was not detected above the level of the reported value. The reported value is either the sample quantitation limit or the sample detection limit.
- L** Indicates results which fall between the sample detection limit and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.
- J** The associated value is an estimated quantity. The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.
- R** The data are unusable. The analyte was analyzed for, but the presence or absence of the analyte cannot be verified.
- UJ** A combination of the "U" and "J" qualifier. The analyte was analyzed for but was not detected. The reported value is an estimate and may be inaccurate or imprecise.

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Friday, April 15, 2005

Lab/Cor Report Number: 041210R06

Howard Edwards
Ecology and Environment, Inc.
350 Sansome
Ste 300
San Francisco CA 94104

Phone: 415-981-2811
Fax: 415-981-0801

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT
Project Number: 0440.01CP-0018
Client Reference:
Sample Receipt Date: 10/15/2004

Enclosed please find results for samples submitted to our laboratory. A list of samples and analyses follows:

Lab/Cor Analysis #	Client Sample # and Description	Analysis Type and Notes
Batch #: B4783		
S46-A1	AAMS-D09-100504	ISO 13794, Indirect: Rejected at Analysis - Particulate Overload
S47-A1	AAMS-D10-100604	ISO 13794, Indirect: Rejected at Analysis - Particulate Overload
S59-A1	AAMS-D16-101204	ISO 13794, Indirect: Rejected at Analysis - Particulate Overload

ISO 13794,
indirect

Preparation and analysis of the above samples was conducted in accordance with the ISO method 13794 (Indirect) for the identification of asbestos. Briefly, a portion of the original filter was ashed and treated with acetic acid to isolate the material of interest. The samples were then aliquoted onto lab filters which were collapsed with acetone, then etched in a low temperature plasma etcher to remove the top surface of the filter and other organics. The samples were carbon coated at high vacuum with a thin layer of carbon, placed on 200 mesh copper grids and allowed to dissolve in acetone until cleared of filter debris.

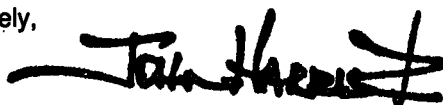
TEM analysis was performed using a transmission electron microscope equipped with an EDS X ray analyzer. The redeposit samples were analyzed at various approximate screen magnifications of 5,000x for PCM equivalent structures, 10,000x for asbestos structures greater than 5.0 micrometer lengths, and 20,000x for asbestos structures greater than 0.5 micrometer lengths. An accelerating voltage of 100 KV was applied. The sizing of grid openings was performed on the microscope at a magnification of approximately 550X.

Disclaimer

This test report relates only to the items tested in this report. Interpretation of these results is the sole responsibility of the client.

If further clarification of these results is needed, please call us. Thank you for allowing the staff at Lab/Cor, Inc. the opportunity to provide you with analytical services.

Sincerely,



Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

John Harris, M.P.H.
Laboratory Director

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

ANALYSIS DETAIL

Lab/Cor Sample No. B4783 S46 A1
Client Sample No. AAMS-D09-100504
Description
Analysis Date 3/29/2005
Analyst KM

Volume (L) 7200
No. of Grid Openings 49
Filter Area (mm2) 193
Area Analyzed (mm2) 0.710
Analytical Sens. (struc/cc) 0.000302
Detection Limit. (struc/cc) 0.000903

Structure Type	Filter Density (s/mm2)	Concentration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	47.9	0.0103	0.00711 - 0.0144 (Poisson)	34
Total Asbestos Structures	47.9	0.0103	0.00711 - 0.0144 (Poisson)	34
Asbestos Structures > 5um	9.9	0.00211	0.000850 - 0.00436	7
Asbestos Fibers and Bundles > 5um	7.0	0.00151	0.000490 - 0.00352	5
PCM Equivalent Fibers-US	7.0	0.00151	0.000490 - 0.00352	5
PCM Equivalent Structures-US	7.0	0.00151	0.000490 - 0.00352	5
PROTOCOL ASB STRUCS 5-10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL ASB STRUCS >10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL ASB STRUCS TOTAL	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000903	0.00 - 0.000903	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000903	0.00 - 0.000903	0
AHERA-like Total Structures 3:1	47.9	0.0103	0.00711 - 0.0144 (Poisson)	34
AHERA-like Asb Strucs >5 and 3:1	9.9	0.00211	0.000850 - 0.00436	7
AHERA-like Asb Strucs 5 - 10 and 3:1	7.0	0.00151	0.000490 - 0.00352	5
AHERA-like Asb Strucs >10 and 3:1	2.8	0.000604	0.00 - 0.00190	2
Total Other Amphibole Strucs 3:1	0.0	<0.000903	0.00 - 0.000903	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000903	0.00 - 0.000903	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000903	0.00 - 0.000903	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000903	0.00 - 0.000903	0

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

ANALYSIS DETAIL

Lab/Cor Sample No. B4783 S47 A1
Client Sample No. AAMS-D10-100604
Description
Analysis Date 3/31/2005
Analyst DW

Volume (L) 7072.96
No. of Grid Openings ~~52~~ 52
Filter Area (mm2) 193
Area Analyzed (mm2) 0.724
Analytical Sens. (struc/cc) 0.000301
Detection Limit. (struc/cc) 0.000901

Structure Type	Filter Density (s/mm2)	Concentration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	139.4	0.0304	0.0245 - 0.0367 (Poisson)	101
Total Asbestos Structures	139.4	0.0304	0.0245 - 0.0367 (Poisson)	101
Asbestos Structures > 5um	29.0	0.00633	0.00392 - 0.00967	21
Asbestos Fibers and Bundles > 5um	23.5	0.00512	0.00298 - 0.00820	17
PCM Equivalent Fibers-US	19.3	0.00422	0.00231 - 0.00708	14
PCM Equivalent Structures-US	4.1	0.000904	0.00 - 0.00234	3
PROTOCOL ASB STRUCS 5-10	2.8	0.000603	0.00 - 0.00190	2
PROTOCOL ASB STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL ASB STRUCS TOTAL	2.8	0.000603	0.00 - 0.00190	2
PROTOCOL CHRYS STRUCS 5-10	2.8	0.000603	0.00 - 0.00190	2
PROTOCOL CHRYS STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL CHRYS STRUCS TOTAL	2.8	0.000603	0.00 - 0.00190	2
PROTOCOL AMPH STRUCS 5-10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL AMPH STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL AMPH STRUCS TOTAL	0.0	<0.000901	0.00 - 0.000901	0
AHERA-like Total Structures 3:1	139.4	0.0304	0.0245 - 0.0367 (Poisson)	101
AHERA-like Asb Strucs >5 and 3:1	29.0	0.00633	0.00392 - 0.00967	21
AHERA-like Asb Strucs 5 - 10 and 3:1	16.6	0.00362	0.00187 - 0.00632	12
AHERA-like Asb Strucs >10 and 3:1	12.4	0.00271	0.00124 - 0.00515	9
Total Other Amphibole Strucs 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000901	0.00 - 0.000901	0

Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

ANALYSIS DETAIL

Lab/Cor Sample No. B4783 S59 A1
Client Sample No. AAMS-D16-101204
Description
Analysis Date 3/31/2005
Analyst JH

Volume (L) 6931.34
No. of Grid Openings 51
Filter Area (mm2) 193
Area Analyzed (mm2) 0.739
Analytical Sens. (struc/cc) 0.000301
Detection Limit. (struc/cc) 0.000901

Structure Type	Filter Density (s/mm2)	Concentration (struc/cc)	95% Confidence Interval (struc/cc)	Struc. Count
Primary Asbestos Structures	71.7	0.0160	0.0120 - 0.0209 (Poisson)	53
Total Asbestos Structures	71.7	0.0160	0.0120 - 0.0209 (Poisson)	53
Asbestos Structures > 5um	25.7	0.00573	0.00345 - 0.00894	19
Asbestos Fibers and Bundles > 5um	17.6	0.00392	0.00209 - 0.00670	13
PCM Equivalent Fibers-US	18.9	0.00422	0.00231 - 0.00708	14
PCM Equivalent Structures-US	18.9	0.00422	0.00231 - 0.00708	14
PROTOCOL ASB STRUCS 5-10	1.4	0.000301	0.00 - 0.00143	1
PROTOCOL ASB STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL ASB STRUCS TOTAL	1.4	0.000301	0.00 - 0.00143	1
PROTOCOL CHRYS STRUCS 5-10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL CHRYS STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL CHRYS STRUCS TOTAL	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL AMPH STRUCS 5-10	1.4	0.000301	0.00 - 0.00143	1
PROTOCOL AMPH STRUCS >10	0.0	<0.000901	0.00 - 0.000901	0
PROTOCOL AMPH STRUCS TOTAL	1.4	0.000301	0.00 - 0.00143	1
AHERA-like Total Structures 3:1	70.4	0.0157	0.0117 - 0.0206 (Poisson)	52
AHERA-like Asb Strucs >5 and 3:1	24.4	0.00543	0.00322 - 0.00858	18
AHERA-like Asb Strucs 5 - 10 and 3:1	14.9	0.00332	0.00166 - 0.00593	11
AHERA-like Asb Strucs >10 and 3:1	9.5	0.00211	0.000848 - 0.00435	7
Total Other Amphibole Strucs 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs >5 and 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs 5 - 10 and 3:1	0.0	<0.000901	0.00 - 0.000901	0
Other Amphibole Strucs >10 and 3:1	0.0	<0.000901	0.00 - 0.000901	0

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D09-100504

Lab/Cor Sample No.: B4783 S46 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B34		NSD									
A	2	B14		NSD									
A	3	B4	AQ	1	1	F	1.5	0.12	12			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	4	C14		NSD									
A	5	B42	CDQ	2	2	F	1.2	0.1	12	1571	1205	Mg, Si Chrysotile Verified - KM	TAS_AHRA
A	6	B22	CD	3	3	F	1.8	0.1	18			Chrysotile	TAS_AHRA
A	7	B2		NSD									
A	8	C12	CDQ	4	4	B	0.8	0.15	5.3			Mg, Si Chrysotile	TAS_AHRA
A	9	C32		NSD									
A	10	B31	AZQ	5	5	F	12	0.8	15	1572	1206	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [5 -1 0] - KM	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	11	B11	CD	6	6	F	1.8	0.1	18			Chrysotile	TAS_AHRA
A	12	C1		NSD									
A	13	C21	CD	7	7	F	1.2	0.08	15			Chrysotile	TAS_AHRA
A	14	C41		NSD									
A	15	A41		NSD									
A	16	A21	AQ	8	8	F	1.8	0.2	9.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	16	A21	AQ	9	9	F	2.2	0.7	3.1			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	17	A1		NSD									
A	18	D11	AQ	10		MD1-0	4.8	1.8	2.7			Actinolite	TAS_AHRA
A	18	D11	AQ		10	MF	1.8	0.3	6.0			Mg, Al, Si, Ca, Fe Actinolite	
A	19	D31		NSD									
A	20	A33		NSD									
A	21	A13	CD	11	11	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	22	D3		NSD									
A	23	D23		NSD									
A	24	D43	CD	12	12	F	0.5	0.08	6.2			Chrysotile	TAS_AHRA
A	24	D43	AQ	13		MD1-0	4.5	3	1.5			Actinolite	TAS_AHRA
A	24	D43	AQ		13	MF	1.8	0.35	5.1			Mg, Al, Si, Ca, Fe Actinolite	
A	25	D10		NSD									
A	26	D30	CD	14	14	F	0.5	0.08	6.2			Chrysotile	TAS_AHRA
A	27	B30	CD	15	15	B	1.2	0.12	10			Chrysotile	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D09-100504

Lab/Cor Sample No.: B4783 S46 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	28	B10	AQ	16	16	F	1.3	0.4	3.2			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	28	B10	AQ	17	17	F	1.6	0.5	3.2			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	28	B10	AQ	18	18	F	5.2	0.8	6.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	29	B42	CD	19	19	F	0.8	0.1	8.0			Chrysotile	TAS_AHRA
B	29	B42	CD	20	20	F	1.2	0.1	12			Chrysotile	TAS_AHRA
B	30	B22		NSD									
B	31	B2		NSD									
B	32	C12		NSD									
B	33	C32	CD	21	21	F	2	0.1	20			Chrysotile	TAS_AHRA
B	34	B33		NSD									
B	35	B40	CD	22	22	F	1	0.07	14			Chrysotile	TAS_AHRA
B	35	B40	CD	23	23	F	0.8	0.07	11			Chrysotile	TAS_AHRA
B	36	B20	CD	24	24	F	0.9	0.06	15			Chrysotile	TAS_AHRA
B	37	C20	AQ	25	25	F	8	1.7	4.7			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	38	C40		NSD									
B	39	D41	CD	26	26	F	0.9	0.07	13			Chrysotile	TAS_AHRA
B	40	D21	AQ	27		MD1-0	7.2	5	1.4			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	40	D21	AQ	27		MF	2.5	0.3	8.3			Mg, Al, Si, Ca, Fe Actinolite	
B	41	D1	AQ	28	28	F	13	1.2	11			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	42	A11	CD	29	29	F	2.2	0.07	31			Chrysotile	TAS_AHRA
B	43	A31	AQ	30		MD1-0	7.5	4.8	1.6			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	43	A31	AQ	30		MF	1	0.25	4.0			Mg, Al, Si, Ca, Fe Actinolite	
B	44	A33		NSD									
B	45	A13		NSD									
B	46	A3		NSD									
B	47	D3	CD	31	31	F	1	0.07	14			Chrysotile	TAS_AHRA
B	48	D23	CD	32	32	F	0.6	0.06	10			Chrysotile	TAS_AHRA
B	48	D23	CD	33	33	F	0.9	0.07	13			Chrysotile	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D09-100504

Lab/Cor Sample No.: B4783 S46 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
B	49	D23	AQ	34	34	F	7.5	1.6	4.7			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA

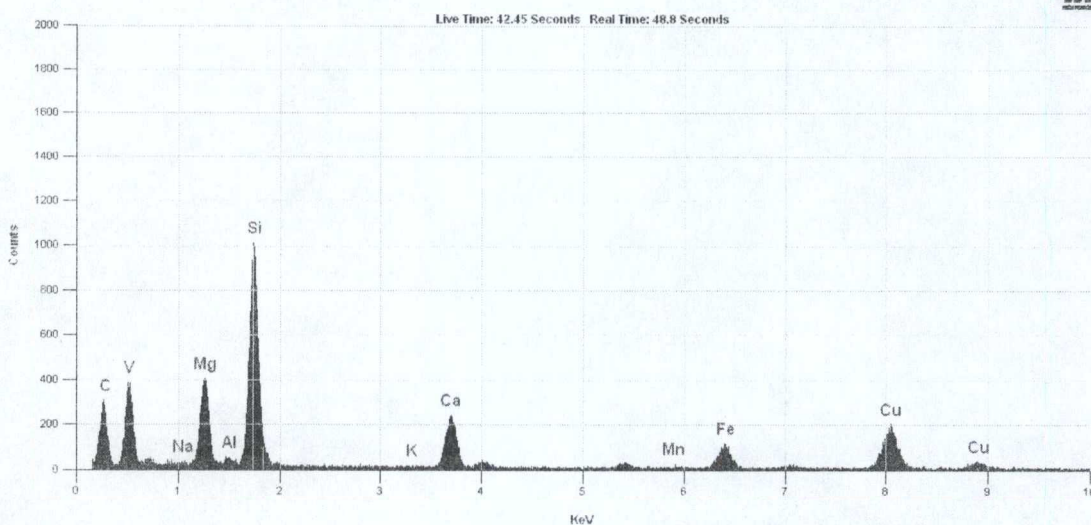
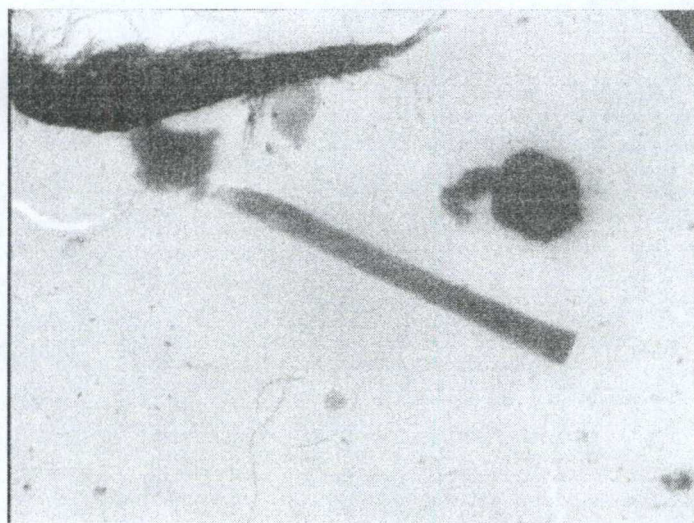
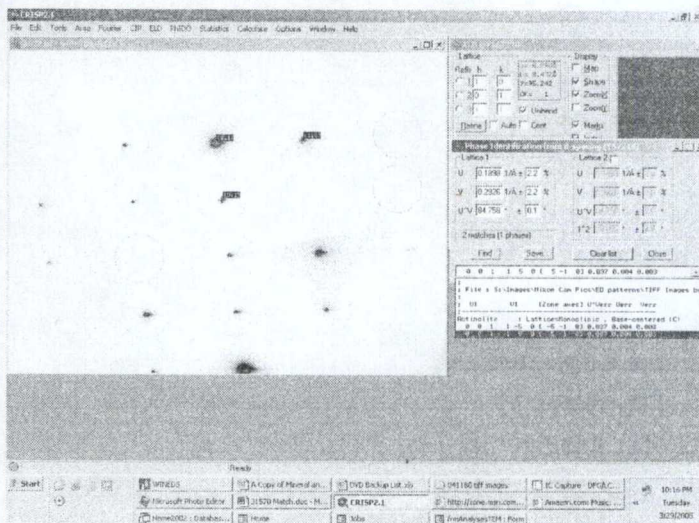
Lab/Cor, Inc.

A Professional Service Corporation in the Northwest

ACTINOLITE - Zone Axis [5 -1 0]

Neg# J1572 Job# 041210-46

JEOL 1200EX - Gatan Image



Title: 041210-46 SP 1206 Time: 9:53:59 PM Date: Tue, Mar 29 2005 Accelerating Voltage: 100 KV Take Off Angle: 35 Degrees

Quantitative Analysis Results - Standardless Analysis :

041210-46 SP 1206 Tue, Mar 29 2005

EDS Parameters - 100KV, Takeoff Angle: 35.0°, Fit Index: 206.00

Correction: CLIFF LORIMER, Cycles: 1

Element	Atoms%	Compound	Weight%	Error(±)	Norm%
Na	0.42	Na2O	0.61	0.30	0.61
Mg	9.65	MgO	18.12	0.63	18.12
Al	0.19	Al2O3	0.44	0.20	0.44
Si	21.63	SiO2	60.58	1.45	60.58
Ca	4.66	CaO	12.19	0.72	12.19
Fe	2.17	Fe2O3	8.06	0.87	8.06
<Total>	100.00		100.00		100.00

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	60.58	Si+4	8.0000	8.0000							
Al2O3	0.44	Al+3	0.0927	0.0000	0.0927						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	8.06	Fe+3	0.0225			0.0225	0.0000				
MgO	18.12	Mg+2	3.7248			3.7248	0.0000				
MnO	0	Fe+2	0.9377			0.9377	0.0000				
CaO	12.19	Mn+2	0.0000			0.0000	0.0000				
Na2O	0.61	Ca+2	1.8140					1.8140	0.0000		
K2O	0	Na+	0.2156					0.1860	0.0296	0.0296	0.0000
		K+	0.0000							0.0000	0.0000
Total	100		Excess	T site	0.0927	C site	0.0000	B site	0.0295564	A site	0

Total	8	4.7777	2.0000	0.0296	0.0000
%Fill	100	95.5541	100		

Prefix none
Name actinolite
Modifier none
Group Calcic Amphibole

Sample # 041210-46-1206

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	2.00 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.19 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.81 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.03 Si > 7.5
Mg/(Mg+Fe2)	0.80 (Mg/(Mg+Fe2))< 0.9
Si	8.00

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D10-100604

Lab/Cor Sample No.: B4783 S47 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	1	B44	AQ	1		MD1-0	1.5	1.5	1.0			Actinolite	TAS_AHRA
A	1	B44	AQ		1	MF	1.5	0.4	3.8			Mg, Si, Ca, Fe Actinolite	
A	2	B24	AZQ	2	2	F	2.5	0.75	3.3	254	15957	Mg, Si, Ca, Fe Actinolite Zone Axis [-2 -1 1]DW	TAS_AHRA
A	3	C14	CDQ	3	3	F	1.5	0.1	15	255	15958	Mg, Si Chrysotile Verified - DW	TAS_AHRA
A	3	C14	CD	4	4	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	3	C14	CD	5		MD1-0	1.5	1.5	1.0			Chrysotile	TAS_AHRA
A	3	C14	CD		5	MF	1	0.1	10			Chrysotile	
A	3	C14	CD	6	6	F	1	0.1	10			Chrysotile	TAS_AHRA
A	3	C14	CD	7	7	F	0.65	0.1	6.5			Chrysotile	TAS_AHRA
A	4	B4		NSD									
A	5	C34		NSD									
A	6	C43		NSD									
A	7	C23	CD	8	8	F	1	0.1	10			Chrysotile	TAS_AHRA
A	7	C23	CD	9		MD1-0	7.5	7.5	1.0			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	7	C23	CD		9	MF	1	0.1	10			Chrysotile	
A	7	C23	CD	10	10	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
A	8	C3	CD	11	11	F	2	0.1	20			Chrysotile	TAS_AHRA
A	8	C3	CD	12		MD1-1	7.5	7.5	1.0			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	8	C3	CD		12	MF	6.5	0.1	65			Chrysotile	AFB>5, PSAS 5-10, PSAS TOT, PCAS 5-10, PCAS TOT
A	9	B13	AQ	13		MD1-1	12	8	1.5			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	9	B13	AQ		13	MF	5.5	0.65	8.5			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	9	B13	CD	14		MD1-0	2.5	2	1.2			Chrysotile	TAS_AHRA
A	9	B13	CD		14	MF	0.65	0.1	6.5			Chrysotile	
A	10	B33	CD	15	15	B	1.5	0.15	10			Chrysotile	TAS_AHRA
A	10	B33	CD	16	16	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA
A	10	B33	AQ	17	17	F	2	0.5	4.0			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
A	10	B33	CD	18	18	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	10	B33	CD	19	19	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA
A	10	B33	CD	20	20	F	0.65	0.1	6.5			Chrysotile	TAS_AHRA
A	10	B33	CD	21	21	F	0.5	0.1	5.0			Chrysotile	TAS_AHRA
A	10	B33	CD	22	22	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D10-100604

Lab/Cor Sample No.: B4783 S47 A1

Description:

Gr	No.	Loc.	ID	Prm	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	10	B33	CD	23	23	F	1	0.1	10			Chrysotile	TAS_AHRA
A	11	B42	AQ	24		MD1-1	12	10	1.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	11	B42	AQ		24	MF	13	0.75	17			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	11	B42	AQ	25	25	F	1	0.2	5.0			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
A	12	B22	CD	26	26	F	0.65	0.1	6.5			Chrysotile	TAS_AHRA
A	12	B22	CD	27	27	F	0.55	0.1	5.5			Chrysotile	TAS_AHRA
A	12	B22	CD	28	28	F	1	0.1	10			Chrysotile	TAS_AHRA
A	13	B1	CD	29		MD1-0	1	1	1.0			Chrysotile	TAS_AHRA
A	13	B1	CD		29	MF	0.65	0.1	6.5			Chrysotile	
A	14	C11		NSD									
A	15	C31	AQ	30		MD1-0	7.5	7.5	1.0			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	15	C31	AQ		30	MF	2.5	0.5	5.0			Mg, Si, Ca, Fe Actinolite	
A	15	C31	CD	31	31	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA
A	15	C31	CD	32	32	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	16	C41		NSD									
A	17	D41	CD	33	33	F	1	0.1	10			Chrysotile	TAS_AHRA
A	17	D41	CD	34	34	F	1	0.1	10			Chrysotile	TAS_AHRA
A	17	D41	AQ	35		MD1-1	7.5	2.5	3.0			Actinolite	AS>5, PCMEF-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	17	D41	AQ		35	MF	6	0.65	9.2			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	17	D41	AQ	36		MD1-1	10	10	1.0			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	17	D41	AQ		36	MF	8	1.5	5.3			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	18	A41	CD	37	37	F	1	0.1	10			Chrysotile	TAS_AHRA
A	19	A21	CD	38	38	F	1	0.1	10			Chrysotile	TAS_AHRA
A	19	A21		NSD									
A	20	A11	AQ	39		MD1-1	20	115	0.17			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	20	A11	AQ		39	MF	14	0.75	19			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	20	A11	AQ	40		MD1-1	9	7.5	1.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	20	A11	AQ		40	MF	9	2.5	3.6			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	21	A1	CD	41	41	F	2.5	0.1	25			Chrysotile	TAS_AHRA
A	21	A1	CD	42	42	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D10-100604

Lab/Cor Sample No.: B4783 S47 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	21	A1	CD	43	43	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
A	21	A1	AQ	44	44	F	2.5	0.5	5.0			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
A	21	A1	AQ	45		MD1-1	10	7.5	1.3			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	21	A1	AQ		45	MF	10	2	5.0			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
A	22	D1	AQ	46	46	F	2.5	0.2	12			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
A	23	D11		NSD									
A	24	D21	CD	47	47	F	1.5	0.15	10			Chrysotile	TAS_AHRA
A	24	D21	CD	48	48	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA
A	24	D21	AZQ	49		MD1-0	15	10	1.5			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	24	D21	AZQ		49	MF	2.75	0.3	9.2	256	15959	Mg, Si, Ca, Fe Actinolite Zone Axis [3 -1 0] - DW	
A	25	D31	CD	50	50	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	25	D31	CD	51	51	F	1.5	0.1	15			Chrysotile	TAS_AHRA
A	25	D31	CD	52	52	F	2	0.1	20			Chrysotile	TAS_AHRA
B	26	B44	CD	53	53	F	0.5	0.1	5.0			Chrysotile	TAS_AHRA
B	26	B44	CD	54		MD1-0	4	4	1.0			Chrysotile	TAS_AHRA
B	26	B44	CD		54	MF	2.5	0.1	25			Chrysotile	
B	26	B44	CD	55		MD1-0	7.5	7.5	1.0			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	26	B44	CD		55	MF	1	0.1	10			Chrysotile	
B	27	B34	AQ	56		MD1-1	6	5	1.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	27	B34	AQ		56	MF	6	1.5	4.0			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
B	27	B34	CD	57	57	F	2.5	0.1	25			Chrysotile	TAS_AHRA
B	27	B34	CD	58	58	F	4.5	0.1	45			Chrysotile	TAS_AHRA
B	28	B24	CD	59	59	F	1.2	0.1	12			Chrysotile	TAS_AHRA
B	29	B14	CD	60	60	F	1	0.1	10			Chrysotile	TAS_AHRA
B	29	B14	CD	61	61	F	6.5	0.1	65			Chrysotile	AS>5, AFB>5, PSAS 5-10, PSAS TOT, PCAS 5-10, PCAS TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	30	C4		NSD									
B	31	C14	CD	62	62	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
B	31	C14	CD	63	63	F	1	0.1	10			Chrysotile	TAS_AHRA
B	31	C14	AQ	64		MD1-0	4	1	4.0			Actinolite	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D10-100604

Lab/Cor Sample No.: B4783 S47 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
B	31	C14	AQ		64	MF	2	0.2	10			Mg, Si, Ca, Fe Actinolite	
B	32	C24	CD	65	65	F	1.5	0.1	15			Chrysotile	TAS_AHRA
B	33	C34	AQ	66		MD1-0	5	2.5	2.0			Actinolite	TAS_AHRA
B	33	C34	AQ		66	MB	3	1	3.0			Mg, Si, Ca, Fe Actinolite	
B	34	C44		NSD									
B	35	B42		NSD									
B	36	B32		NSD									
B	37	B22	CD	67	67	F	1.5	0.15	10			Chrysotile	TAS_AHRA
B	37	B22	CD	68	68	F	1	0.1	10			Chrysotile	TAS_AHRA
B	38	B12	CD	69	69	F	2.5	0.1	25			Chrysotile	TAS_AHRA
B	38	B12	CD	70	70	F	0.5	0.1	5.0			Chrysotile	TAS_AHRA
B	38	B12	CD	71	71	F	0.65	0.1	6.5			Chrysotile	TAS_AHRA
B	38	B12	CD	72	72	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
B	39	B2	CD	73	73	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
B	39	B2	CD	74	74	F	1	0.1	10			Chrysotile	TAS_AHRA
B	39	B2	AQ	75		MD1-1	20	15	1.3			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	39	B2	AQ		75	MF	6	0.65	9.2			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
B	39	B2	CD	76		MD1-0	3.5	36.5	0.096			Chrysotile	TAS_AHRA
B	39	B2	CD		76	MF	1.5	0.1	15			Chrysotile	
B	40	C2	CD	77	77	F	2	0.1	20			Chrysotile	TAS_AHRA
B	40	C2	CD	78	78	F	1	0.1	10			Chrysotile	TAS_AHRA
B	41	C12	AQ	79		MD1-1	12	7.5	1.6			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	41	C12	AQ		79	MF	6.5	1	6.5			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
B	41	C12	CD	80	80	F	1	0.1	10			Chrysotile	TAS_AHRA
B	41	C12	CD	81	81	F	1.2	0.1	12			Chrysotile	TAS_AHRA
B	42	C22	CD	82	82	F	1	0.1	10			Chrysotile	TAS_AHRA
B	42	C22	CD	83	83	F	0.5	0.1	5.0			Chrysotile	TAS_AHRA
B	42	C22	CD	84	84	B	1.5	0.15	10			Chrysotile	TAS_AHRA
B	42	C22	CD	85	85	F	1	0.1	10			Chrysotile	TAS_AHRA
B	43	C42	CD	86	86	F	0.75	0.1	7.5			Chrysotile	TAS_AHRA
B	44	A41	CD	87	87	F	0.65	0.1	6.5			Chrysotile	TAS_AHRA
B	45	A31	CD	88	88	F	1	0.1	10			Chrysotile	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D10-100604

Lab/Cor Sample No.: B4783 S47 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
B	45	A31	AQ	89	89	F	26	2.5	10			Mg, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	46	A21	CD	90	90	F	0.6	0.1	6.0			Chrysotile	TAS_AHRA
B	47	A11	CD	91	91	F	1	0.1	10			Chrysotile	TAS_AHRA
B	47	A11	AQ	92	92	F	14	4	3.5			Mg, Si, Ca, Fe Actinolite	AS>5, AFB>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	47	A11	CD	93	93	F	1	0.1	10			Chrysotile	TAS_AHRA
B	48	A1	CD	94	94	F	1	0.1	10			Chrysotile	TAS_AHRA
B	48	A1	AQ	95	95	F	9	1.2	7.5			Mg, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	49	D1	AQ	96		MD1-1	12	10	1.2			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	49	D1	AQ	96		MF	7.5	1.2	6.2			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
B	49	D1	CD	97	97	F	2	0.1	20			Chrysotile	TAS_AHRA
B	49	D1	AQ	98		MD1-1	7.5	7.5	1.0			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	49	D1	AQ	98		MF	9	1.5	6.0			Mg, Si, Ca, Fe Actinolite	AFB>5, PCMEF-US
B	50	D11	AQ	99	99	F	3	0.75	4.0			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
B	51	D21		NSD									
B	52	D31	AQ	100	100	F	0.5	0.1	5.0			Mg, Si, Ca, Fe Actinolite	TAS_AHRA
B	52	D31	CD	101	101	F	0.5	0.05	10			Chrysotile	TAS_AHRA

Lab/Cor, Inc.

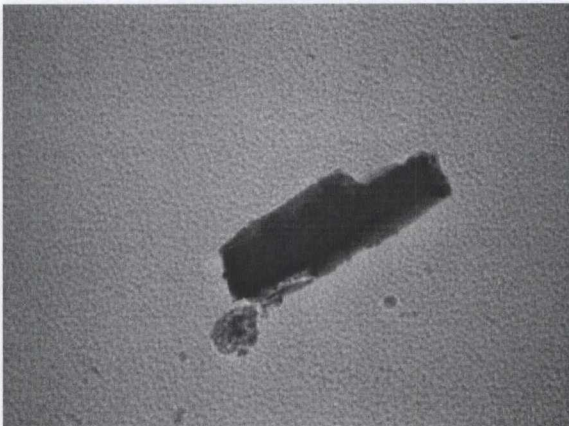
A Professional Service Corporation in the Northwest

Actinolite

Neg# [254]; [Job# 041210-47]

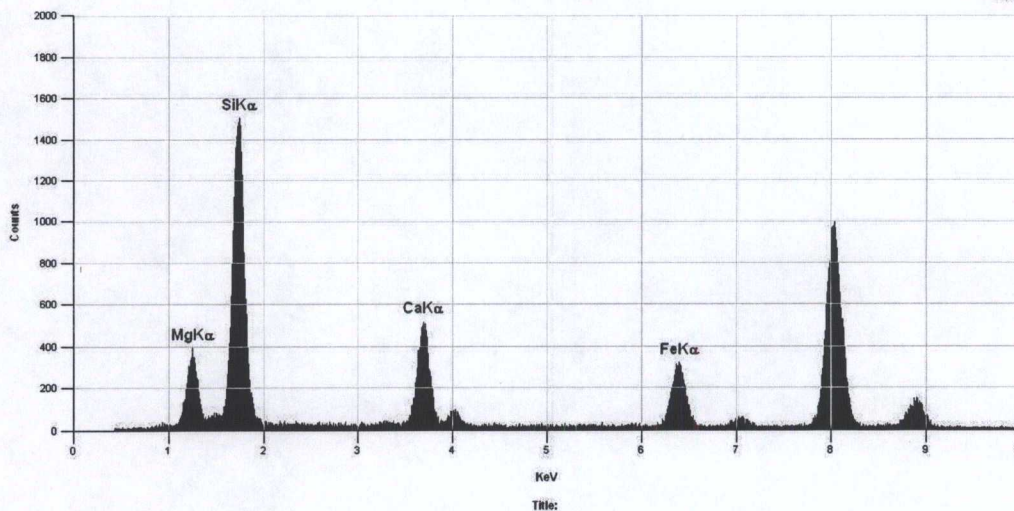
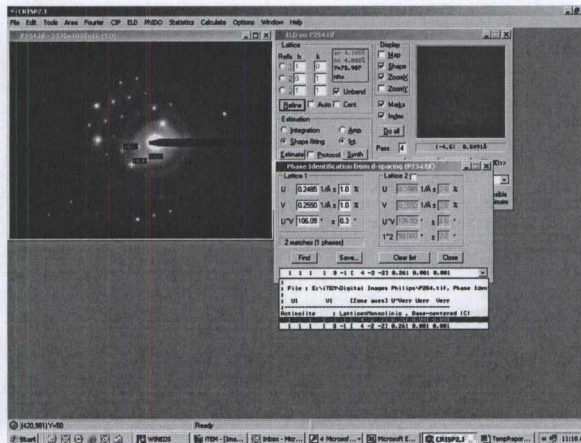
[3-31-05] iTEM Image

Zone Axis [-2 -1 1]



13900 : 1

1μm



WINEDS

Quantitative Analysis Results - Standardless Analysis :

041210-47 EDS# 15957 Thu, Mar 31 2005

EDS Parameters - 100KV, Takeoff Angle: 38.0°, Fit Index: 11.14

Element	Atoms%	Compound	Weight%	Error(±)	Norm%
Mg	8.44	MgO	15.53	0.95	15.53
Si	21.43	SiO2	58.76	1.64	58.76
Ca	4.91	CaO	12.57	0.64	12.57
Fe	3.60	Fe2O3	13.13	0.96	13.13
<Total>	100.00		100.00		100.00

7619 6th Avenue NW, Seattle, WA 98117

www.labcor.net Phone: (206) 781-0155 (Office) Fax: (206) 789-8424 E-mail: mail@labcor.net

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	58.76	Si+4	8.0000	8.0000							
Al2O3	0	Al+3	0.0000	0.0000	0.0000						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	13.13	Fe+3	0.0310			0.0310	0.0000				
MgO	15.53	Mg+2	3.2925			3.2925	0.0000				
MnO	0	Fe+2	1.5519			1.5519	0.0000				
CaO	12.57	Mn+2	0.0000			0.0000	0.0000				
Na2O	0	Ca+2	1.9244					1.9244	0.0000		
K2O	0	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0000							0.0000	0.0000
Total	99.99		Excess	T site	0.0000	C site	0.0000	B site	0	A site	0

Total	8	4.8754	1.9244	0.0000	0.0000
%Fill	100	97.5076	96.22		

Prefix none
Name actinolite
Modifier none
Group Calcic Amphibole

Sample # 041210-47-15957

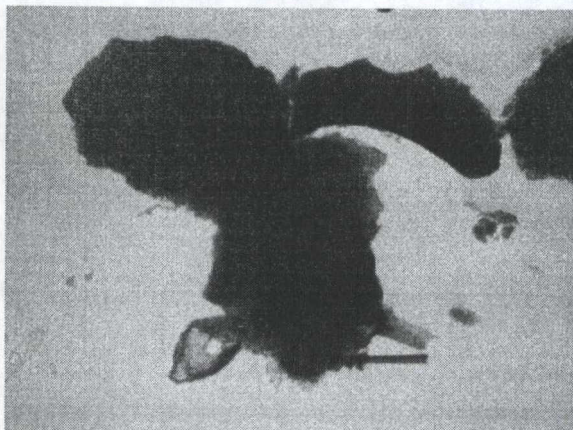
<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.92 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.92 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.68 (Mg/(Mg+Fe2))< 0.9
Si	8.00

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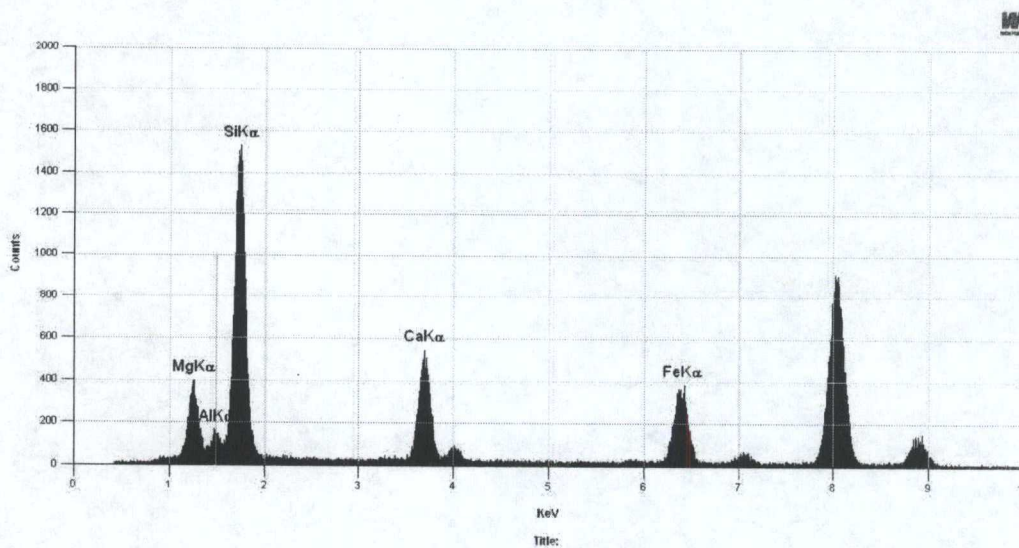
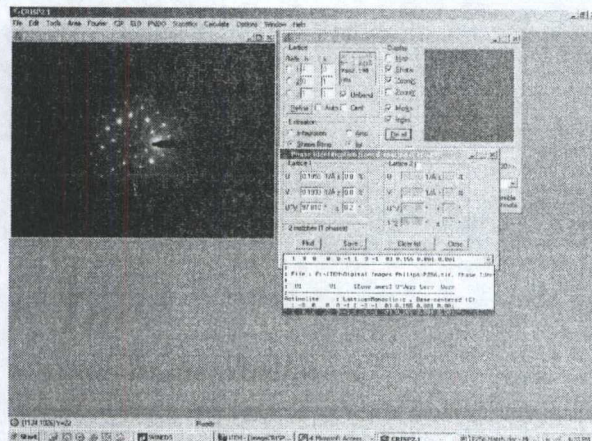
ACTINOLITE

Neg#[256]; [Job# 041210-47]
[3-31-05] iTEM Image
Zone Axis [3 -1 0]



5650 : 1

2µm



Quantitative Analysis Results - Standardless Analysis :
041210-47 EDS#15959 EDS Spectrum Thu, Mar 31 2005
EDS Parameters - 100KV, Takeoff Angle: 38.0°, Fit Index: 6.63

Element	Atoms%	Compound	Weight%	Error(±)	Norm%
Mg	8.40	MgO	15.43	0.78	15.43
Al	0.59	Al2O3	1.37	0.20	1.37
Si	20.98	SiO2	57.47	1.32	57.47
Ca	4.55	CaO	11.64	0.55	11.64
Fe	3.87	Fe2O3	14.08	0.89	14.08
<Total>	100.00		100.00		100.00

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	57.47	Si+4	7.9900	7.9900							
Al2O3	1.37	Al+3	0.2245	0.0100	0.2145						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	14.08	Fe+3	0.2946			0.2946	0.0000				
MgO	15.43	Mg+2	3.1981			3.1981	0.0000				
MnO	0	Fe+2	1.3095			1.2928	0.0167				
CaO	11.64	Mn+2	0.0000			0.0000	0.0000				
Na2O	0	Ca+2	1.7337					1.7337	0.0000		
K2O	0	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0000							0.0000	0.0000
Total	99.99		Excess	T site	0.2145	C site	0.0167	B site	0	A site	0

Prefix	none	Total	8	5.0000	1.7337	0.0000	0.0000
Name	actinolite	%Fill	100	100	86.6865		
Modifier	none						
Group	Calcic Amphibole						

Sample # 041210-47-15959

Values	Satisfied Conditions
(Ca,Na)@B	1.73 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.73 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.71 (Mg/(Mg+Fe2))< 0.9
Si	7.99

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D16-101204

Lab/Cor Sample No.: B4783 S59 A1

Description:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wid	Asp	Neg#	EDS#	Comment	Count Categories
A	1	A34		NSD									
A	2	A14	CDQ	1		MD1-0	6	4.8	1.2			Chrysotile	AS>5, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	A14	CDQ		1	MF	0.9	0.06	15			Mg, Si Chrysotile	
A	2	A14	AQ	2	2	F	7.5	0.45	17			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, PSAS 5-10, PSAS TOT, PSAM 5-10, PSAM TOT, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	2	A14	CDQ	3	3	F	1.2	0.07	17	1574	1208	Mg, Si Chrysotile Verified - JH	TAS_AHRA
A	3	D4		NSD									
A	4	D24		NSD									
A	5	D34		NSD									
A	6	D42		NSD									
A	7	D22	CD	4	4	B	0.8	0.08	10			Chrysotile	TAS_AHRA
A	8	D2		NSD									
A	9	A12	CD	5	5	F	2	0.06	33			Chrysotile	TAS_AHRA
A	9	A12	AQ	6	6	B	9.5	2.5	3.8			Mg, Al, Si, Ca, Fe Actinolite	AS>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	10	A32		NSD									
A	11	A30		NSD									
A	12	A20		NSD									
A	13	D10	CD	7	7	F	1.1	0.07	16			Chrysotile	TAS_AHRA
A	13	D10	CD	8	8	F	0.6	0.06	10			Chrysotile	TAS_AHRA
A	14	D30		NSD									
A	15	D40	CD	9	9	F	0.7	0.06	12			Chrysotile	TAS_AHRA
A	15	D40	CD	10	10	F	0.6	0.07	8.6			Chrysotile	TAS_AHRA
A	15	D40	CD	11	11	F	0.5	0.06	8.3			Chrysotile	TAS_AHRA
A	16	C41	CD	12	12	F	0.7	0.06	12			Chrysotile	TAS_AHRA
A	17	C21	CD	13		MD1-0	1	0.7	1.4			Chrysotile	TAS_AHRA
A	17	C21	CD		13	MF	0.5	0.06	8.3			Chrysotile	
A	17	C21	CD	14	14	F	1.1	0.07	16			Chrysotile	TAS_AHRA
A	17	C21	AZQ	15		MD1-0	16	12	1.3			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
A	17	C21	AZQ		15	MF	3	1	3.0	1575	1209	Mg, Al, Si, Ca, Fe Actinolite Zone Axis [5 1 6] - JH	
A	17	C21	AQ	16	16	F	2.6	0.7	3.7			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D16-101204

Lab/Cor Sample No.: B4783 S59 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
A	18	C1		NSD									
A	19	B11	AZQ	17	17	F	5.5	1.3	4.2	1576	1210	Mg, Si, Ca, Fe Tremolite Zone Axis [7 3 0] - JH	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	19	B11	AQ	18	18	F	3.8	1	3.8			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	19	B11	AQ	19	19	F	2.7	0.2	14			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	19	B11	AQ	20	20	F	5.1	1.2	4.2			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
A	19	B11	CDQ	21	21	F	2.4	0.08	30			Mg, Si Chrysotile	TAS_AHRA
A	20	B31		NSD									
A	21	B41		NSD									
A	22	B33	CD	22	22	F	1.7	0.08	21			Chrysotile	TAS_AHRA
A	23	B13	AQ	23	23	F	3	0.2	15			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	24	C3		NSD									
A	25	C23	AQ	24	24	F	2.5	0.5	5.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
A	26	C43		NSD									
B	27	B24		NSD									
B	28	C4	CD	25	25	F	0.8	0.07	11			Chrysotile	TAS_AHRA
B	29	C24	AQ	26	26	F	3.5	0.5	7.0			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	30	C34	AQ	27	27	F	9	2.2	4.1			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	30	C34	AQ	28		MD1-0	13	12	1.1			Actinolite	AS>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	30	C34	AQ		28	MF	3.5	0.6	5.8			Mg, Al, Si, Ca, Fe Actinolite	
B	30	C34	AQ	29	29	F	5.5	0.7	7.9			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	30	C34	CD	30	30	F	3	0.08	38			Chrysotile	TAS_AHRA
B	30	C34	CD	31	31	F	1	0.07	14			Chrysotile	TAS_AHRA
B	30	C34	AQ	32	32	F	2.2	0.6	3.7			Mg, Al, Si, Ca, Fe Tremolite	TAS_AHRA
B	30	C34	CD	33	33	F	1	0.08	12			Chrysotile	TAS_AHRA
B	31	C42	CD	34	34	F	0.6	0.07	8.6			Chrysotile	TAS_AHRA
B	32	C22		NSD									
B	33	C2	AQ	35	35	F	3	0.7	4.3			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	34	B12		NSD									

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06

Client: Ecology and Environment, Inc.

Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D16-101204

Lab/Cor Sample No.: B4783 S59 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
B	35	B22	AQ	36	36	B	11	2.3	4.8			Mg, Al, Si, Ca, Fe Tremolite	AS>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	36	B42		NSD									
B	37	B40	AQ	37	37	F	5.1	1.3	3.9			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	37	B40	AQ	38	38	F	1	0.3	3.3			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	37	B40	AQ	39	39	F	8	2.1	3.8			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	38	B20		NSD									
B	39	B10		NSD									
B	40	C10	AQ	40	40	F	13	3.8	3.4			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	41	C30	AQ	41	41	F	8	2.3	3.5			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	42	C40		NSD									
B	43	D41	AQ	42	42	B	26	2	13			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	43	D41	AQ	43	43	F	4.9	1	4.9			Mg, Si, Ca, Fe Tremolite	TAS_AHRA
B	44	D21		NSD									
B	45	D1		NSD									
B	46	A11	AQ	44	44	B	6.5	1.3	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS5-10_AHRA
B	47	A21	CDQ	45	45	CC25-0	6	3.5	1.7			Mg, Si Chrysotile	AS>5
B	48	A23	CD	46	46	F	0.9	0.15	6.0			Chrysotile	TAS_AHRA
B	48	A23	CD	47	47	F	1.2	0.1	12			Chrysotile	TAS_AHRA
B	48	A23	CD	48	48	F	1.5	0.2	7.5			Chrysotile	TAS_AHRA
B	49	A3	AQ	49	49	F	2.6	0.55	4.7			Mg, Al, Si, Ca, Fe Actinolite	TAS_AHRA
B	49	A3	CD	50		MD1-0	3.5	2.8	1.2			Chrysotile	TAS_AHRA
B	49	A3	CD	50		MF	1	0.1	10			Chrysotile	
B	49	A3	AQ	51	51	F	15	3	5.0			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA
B	50	D3	AQ	52	52	F	12	1	12			Mg, Al, Si, Ca, Fe Actinolite	AS>5, AFB>5, PCMEF-US, PCMES-US, TAS_AHRA, AS>5_AHRA, AS>10_AHRA

Lab/Cor, Inc.
A Professional Service Corporation in the Northwest

Report # 041210R06
Client: Ecology and Environment, Inc.
Project Name: Site 0440.01CP Sample Set#4 - FINAL REPORT

TEM ASBESTOS STRUCTURE COUNT - RAW DATA

Sample No.: AAMS-D16-101204

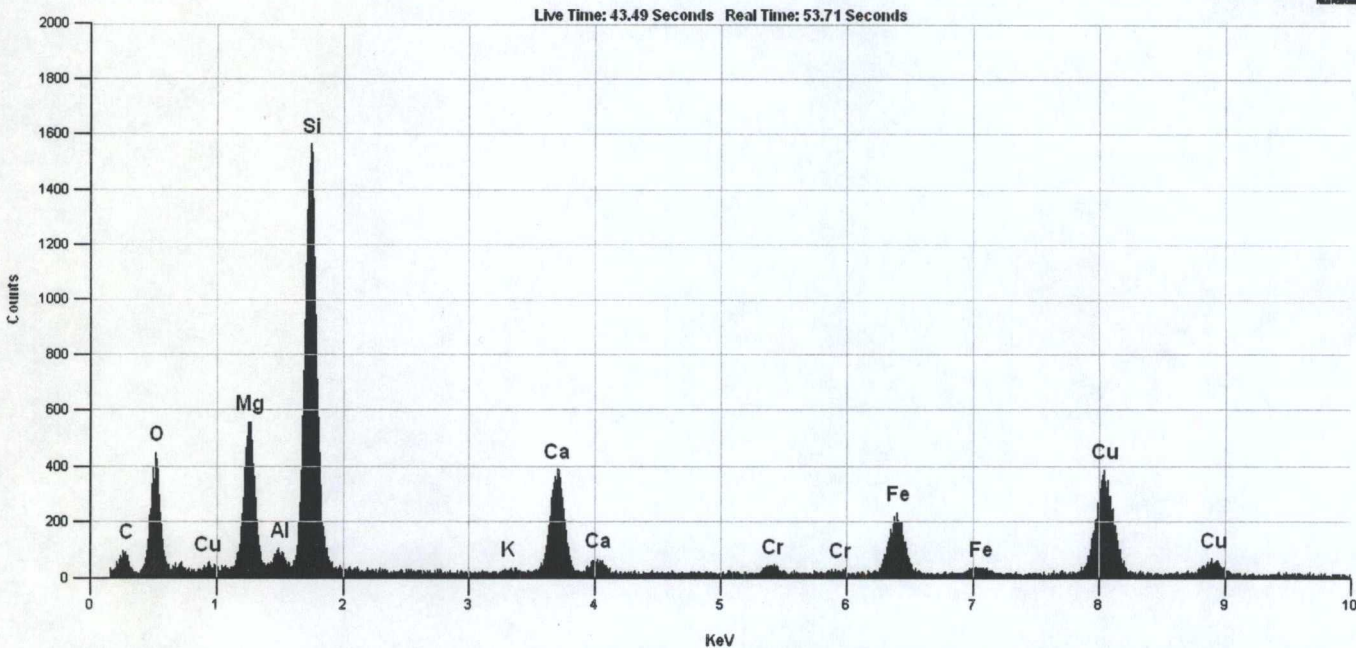
Lab/Cor Sample No.: B4783 S59 A1

Descripton:

Gr	No.	Loc.	ID	Prim	Tot	Class	Len	Wld	Asp	Neg#	EDS#	Comment	Count Categories
B	51	C23	CD	53	53	F	1.6	0.15	11			Chrysotile	TAS_AHRA

<p>NSD = No Structures Detected PAS = Primary Asbestos Structures TAS = Total Asbestos Structures AS>5 = Asbestos Structures > 5um AFB>5 = Asbestos Fibers and Bundles > 5um PCMEF-US = PCM Equivalent Fibers-US PCMES-US = PCM Equivalent Structures-US PCMEF-ISO = PCM Equivalent Fibers-ISO PCMES-ISO = PCM Equivalent Structures-ISO</p> <p>CF = Cleavage Fragments TS = Transitional Structures</p>	<p>PSAS 5-10 = PROTOCOL ASB STRUCS 5-10 PSAS >10 = PROTOCOL ASB STRUCS >10 PSAS TOT = PROTOCOL ASB STRUCS TOTAL PSCH 5-10 = PROTOCOL CHRYS STRUCS 5-10 PSCH >10 = PROTOCOL CHRYS STRUCS >10 PSCH TOT = PROTOCOL CHRYS STRUCS TOTAL PSAM 5-10 = PROTOCOL AMPH STRUCS 5-10 PSAM >10 = PROTOCOL AMPH STRUCS >10 PSAM TOT = PROTOCOL AMPH STRUCS TOTAL</p> <p>PChS = Primary Chrysotile Structures PAmS = Primary Amphibole Structures</p>	<p>TAS_AHRA = AHERA-like Total Strucs 3:1 AS>5_AHRA = AHERA-like Asb Strucs >5 and 3:1 AS5-10_AHRA = AHERA-like Asb Strucs 5 - 10 and 3:1 AS>10_AHRA = AHERA-like Asb Strucs >10 and 3:1 TOS_AHRA = Total Other Amphibole Strucs 3:1 OS>5_AHRA = Other Amphibole Struc >5 and 3:1 OS5-10_AHRA = Other Amphibole Struc 5 - 10 and 3:1 OS>10_AHRA = Other Amphibole Strucs >10 and 3:1</p>
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ACTINOLITE
[5 1 6] Zone Axis
041210-59, Neg#J1575



Title: 041210-59-SP1209 Time: 6:23:29 PM Date: Thu, Mar 31 2005 Accelerating Voltage: 100 KV Take Off Angle: 35 Degrees

Quantitative Analysis Results - Standardless Analysis :

041210-59-SP1209 Thu, Mar 31 2005

EDS Parameters - 100KV, Takeoff Angle: 35.0°, Fit Index: 139.66

Correction: CLIFF LORIMER, Cycles: 1

Element	Atoms%	Compound	Weight%	Error(±)	Norm%
Mg	8.15	MgO	15.13	0.45	15.13
Al	0.35	Al2O3	0.83	0.16	0.83
Si	21.87	SiO2	60.51	1.13	60.51
K	0.12	K2O	0.25	0.14	0.25
Ca	4.87	CaO	12.56	0.56	12.56
Fe	2.92	Fe2O3	10.72	0.74	10.72
<Total>	100.00		100.00		100.00

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	60.51	Si+4	8.0000	8.0000							
Al2O3	0.83	Al+3	0.1638	0.0000	0.1638						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	10.72	Fe+3	0.0300			0.0300	0.0000				
MgO	15.13	Mg+2	3.1693			3.1693	0.0000				
MnO	0	Fe+2	1.2594			1.2594	0.0000				
CaO	12.56	Mn+2	0.0000			0.0000	0.0000				
Na2O	0	Ca+2	1.8998					1.8998	0.0000		
K2O	0.25	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0758							0.0758	0.0000
Total	100		Excess	T site	0.1638	C site	0.0000	B site	0	A site	0

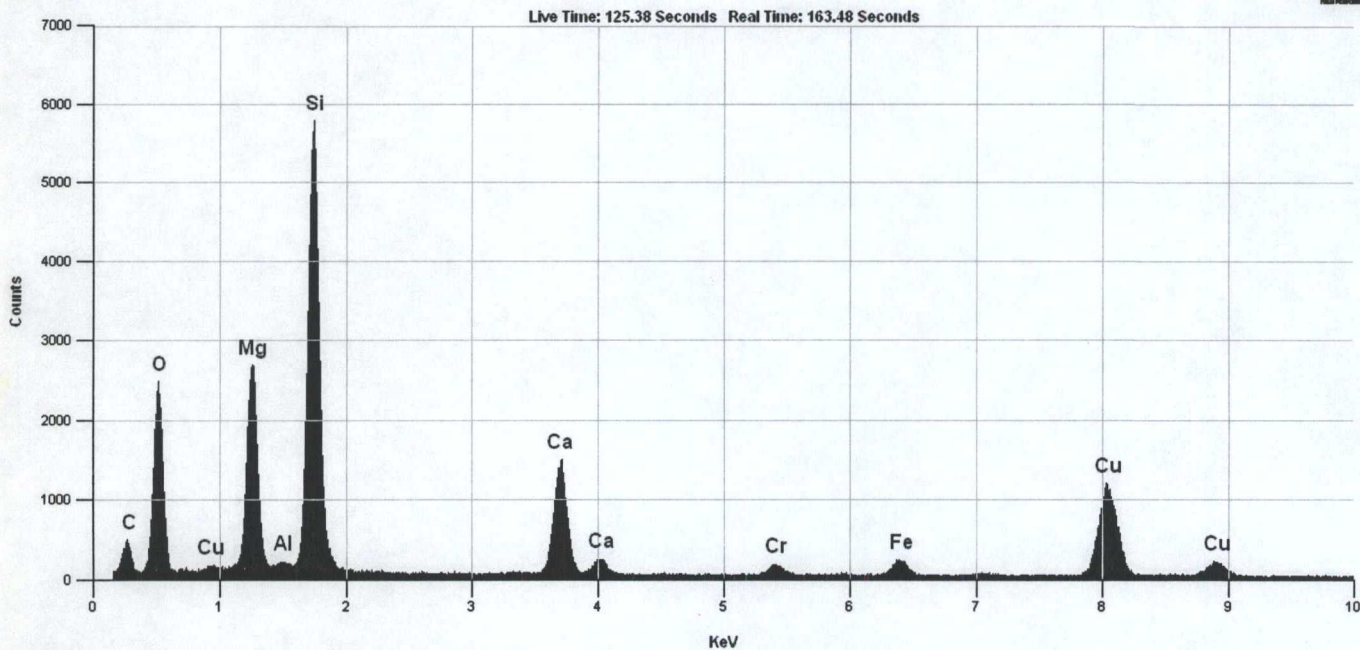
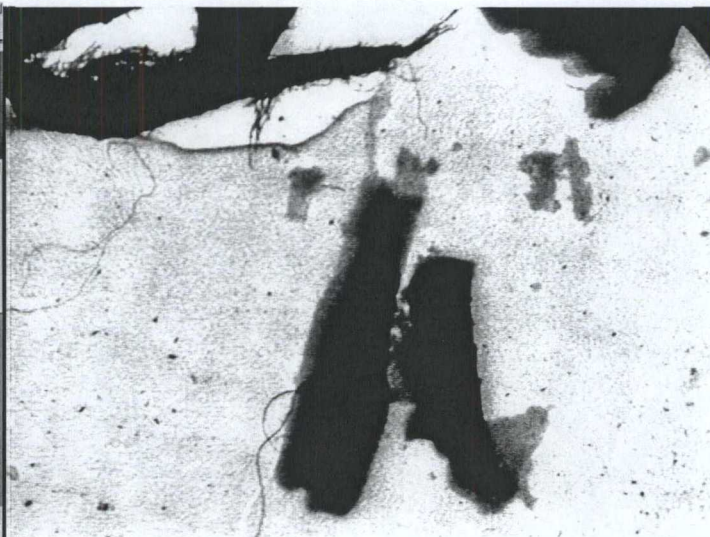
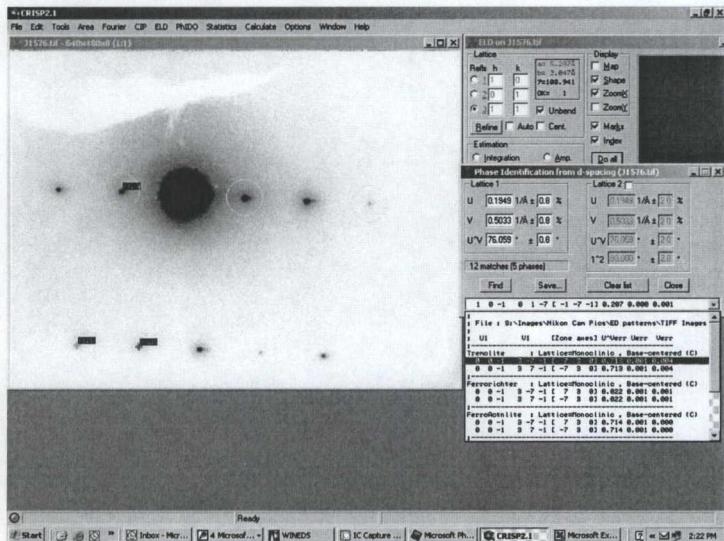
Total	8	4.6224	1.8998	0.0758	0.0000
%Fill	100	92.4479	94.9878		

Prefix none
Name actinolite
Modifier none
Group Calcic Amphibole

Sample # 041210-59-1209

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.90 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.90 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.08 Si > 7.5
Mg/(Mg+Fe2)	0.72 (Mg/(Mg+Fe2))< 0.9
Si	8.00

TREMOLITE
[7 3 0] Zone Axis
041210-59, Neg#J1576



Title: 041210-59-SP1210 Time: 12:36:40 PM Date: Fri, Apr 01 2005 Accelerating Voltage: 100 KV Take Off Angle: 35 Degrees

Quantitative Analysis Results - Standardless Analysis :
041210-59-SP1210 Fri, Apr 01 2005
EDS Parameters - 100KV, Takeoff Angle: 35.0°, Fit Index: 254.32
Correction: CLIFF LORIMER, Cycles: 1

Element	Atoms%	Compound	Weight%	Error(±)	Norm%
Mg	11.49	MgO	21.96	0.29	21.96
Si	21.71	SiO2	61.86	0.61	61.86
Ca	5.03	CaO	13.38	0.31	13.38
Fe	0.74	Fe2O3	2.81	0.24	2.81
<Total>	100.00		100.00		100.00

	Wt Percent		ions	T site	Leftover	C site	Leftover	B site	Leftover	A site	Leftover
SiO2	61.86	Si+4	8.0000	8.0000							
Al2O3	0	Al+3	0.0000	0.0000	0.0000						
TiO2	0	Ti+4	0.0000	0.0000	0.0000						
Cr2O3	0	Cr+3	0.0000			0.0000	0.0000				
Fe(total)O	2.81	Fe+3	0.0232			0.0232	0.0000				
MgO	21.96	Mg+2	4.4296			4.4296	0.0000				
MnO	0	Fe+2	0.3544			0.3544	0.0000				
CaO	13.38	Mn+2	0.0000			0.0000	0.0000				
Na2O	0	Ca+2	1.9622					1.9622	0.0000		
K2O	0	Na+	0.0000					0.0000	0.0000	0.0000	0.0000
		K+	0.0000							0.0000	0.0000
Total	100.01		Excess	T site	0.0000	C site	0.0000	B site	0	A site	0

Total	8	4.8072	1.9622	0.0000	0.0000
%Fill	100	96.1434	98.1093		

Prefix none
Name tremolite
Modifier none
Group Calcic Amphibole

Sample # 041210-59-1210

<u>Values</u>	<u>Satisfied Conditions</u>
(Ca,Na)@B	1.96 (Ca,Na)@B >= 1 and Na@B < 0.5
Na@B	0.00 Ca@B >= 1.5 and (Na,K)@A < 0.5
Ca@B	1.96 (Mg/(Mg+Fe2))>= 0.5
(Na,K)@A	0.00 Si > 7.5
Mg/(Mg+Fe2)	0.93 (Mg/(Mg+Fe2))>= 0.9
Si	8.00

The hard copy of the additional information for this data package including:

- QC Summary
- QC Package (microscope logs and calibrations)
- Sample preparation logs

can be found in the file for Data Package 041172R07.

The information can also be found on the CD under
From Lab\Data Package\QC and Additional Information